

REW joined us in Geneva on February 1, for initial conversations with the World Health Organization staff. We left Geneva on February 5, arriving in Delhi (India) on the evening of the 6th. Departure from Delhi on 11th by way of Calcutta to Hongkong where we arrived on the 12th. We went to Taipeh on the 14th and on the 16th started south returning to Taipeh on the 19th and proceeding to Manila on the 20th. From Manila to Ceylon on February 25th, with February 27 and 28th devoted to a trip to the dry areas of the north-eastern part of the island. March 1, to Madras; March 2 to Bangalore; March 4th to 11th, station-wagon tour of Mysore state and Coonoor. March 14th, Bangalore to Delhi. This week has been devoted largely to the Third Asian Malaria Congress which is also referred to as the First Asian Malaria Eradication Congress, since the previous two Congresses were devoted to malaria control.

Feb. 1
March 1959
Diary
mch
19th
addendum

In Taiwan, Ceylon and Mysore State (India), we had an opportunity not only to discuss the situation with the technical people responsible for the eradication programs but also were able to get to the field and see the terrain and visualise the problems encountered. In the Philippines, we had to depend on conversations at headquarters and at the malaria institute but had the advantage of access to the ICA staff impressions.

One finds that there is a typical pattern emerging in each of the countries visited. Malaria has been greatly reduced and probably transmission stopped in large groups of population in the most accessible areas where the

population is living and working in the traditional stable manner. The failure to get malaria eradication is apparently largely due to a failure to adapt the administrative procedures of the eradication service to certain unstable elements of the population and especially to the peripheral population living in scattered habitations often times in foot-hills or in mountainous areas.

~~In none of the countries visited~~ ^{Nowhere} did the responsible authorities attribute failure to the development of resistance to insecticides by vector mosquitos nor to a failure of malaria to disappear within a reasonable period of time once transmission had been interrupted. In other words, one can say that the failure of malaria to disappear completely from these countries has been due to the failure to adapt the administrative methods for the application of insecticides to scattered houses in difficult terrain, to the temporary habitations of seasonal agricultural workers and to the shelters of squatters in areas under development.

There seems to be no evidence in the countries we visited that failure to eradicate has been due to error of the initial premise, that malaria would disappear when transmission had been interrupted by residual insecticides. Where accessible population groups have been properly covered malaria has either disappeared or dropped to almost zero. Failure has been due to administrative difficulties rather than to technical ones. There has been difficulty in some areas in finding all the houses; in other areas in finding new houses immediately after construction and in many areas there has been inadequate checking and supervision of the work.

Certain of the cleaned areas are large enough to justify the conclusion that the residual insecticides can stop transmission and that in the absence of transmission, malaria itself disappears within a reasonable time.

The failure of eradication programs to eradicate has led to greatly increased interest in searching out and treating persons with malaria, not for the purpose of revealing the areas where transmission has continued in spite of residual insecticides so that administrative or technical defects can be corrected, but in the hope of using therapy to remove the final seedbed of parasites from the human population. This switch from an attack on the malaria parasite in the mosquito with residual insecticides to a campaign against the plasmodia in the human host based on searching out and treating all infected persons, may well be disastrous in its effect on the eradication program.

While it has been anticipated that a small percentage of the malaria problem would have to be taken care of with methods other than residual insecticiding, the real premise on which the program was founded is that malaria transmission can, in most malarious areas of the world, be interrupted and that such interruption will be followed after a suitable period by spontaneous disappearance of the infection in the human population of the area worked.

Unconsciously, almost, many workers have changed their working premise; they now seem to say that residual insecticide will get rid of the bulk of the infection in the easily accessible population but that the final roots of infection in the peripheral population must be eradicated with drugs.

1959

3 Feb - 19 March 1957

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FEBRUARY 3RD:

Dr. Bruce Chwatt: Original plans in India did not include the hypo-endemic areas but only the areas in which there was a very serious problem (one delay was caused by insistence of Indian Government that vehicles should be tyred by Dunlop tyres manufactured in India. Cars arrived and remained for over a year without tyres). As late as 1956, some of the states were still trying to do spraying with voluntary teams. BC says that he was fighting for regional organization within the country; RBW says he planned five regional organizations in 1952! BC confirms the fact that poor work in India gives good results. BC believes that with good administration, there is no doubt regarding the final eradication of malaria. East Pakistan probably has more a. sundaicus than Bengal; otherwise problems may be very largely the same. West Pakistan is doing nothing as yet. Nepal is working and has three WHO teams. India-Nepal border has special attention from the Nepal side. In Pakistan, everyone including PFR thought they were getting some good reaction only to be disappointed. (Discussion of Afridi and Jafar situation!!!)

Discussion with Dr. Weeks and BC. Problem of A. stephensi, urban malaria vector has not been properly worked with. Filariasis problem is tremendous and we are not in a position to do anything about it since the vector species becomes rapidly resistant to insecticides. BC suggests that we visit Malaya to help convince authorities of possibilities of eradication. Viet-Nam two organizations trying to do the same thing; clash between ICA and Manila office of WHO.

Third Asian Malaria Conference; 16th to 21st of March - Delhi Ministers invited for first three days; BC is preparing report on malaria eradication in USSR: behind in drugs, in insecticides etc but they are getting results. No compressed air sprayers. Ground is prepared for eradication and are now having only 3,500 cases per year. Controls of individuals who have had malaria are tremendous; surveillance is almost perfect in USSR. (RBW tells of old surveillance in the Japanese malarious areas under the empire with the malaria control work hooked up with police force: people either came in for treatment or the officers went out and brought them in; but this all failed during World-War II and in the absence of quinine supplies, Formosa became very highly malarious.) RBW tells of one area in India where, following the building of a dam, malaria became so bad that the area was rapidly depopulated: in contrast to this, BC tells of hyperendemic areas in Sarawak where the only obvious effects of malaria are early illness and increased death-rate among infants.

2,000 malariologist)	
850 entomologists)	1951)
350 engineers)	1956) USSR

2,000 of 3,500 cases are in Asian areas; claim they will have eradication of malaria within another two years.

Feb 5 - Geneva Rome
6 Arrive Delhi
7 - 10 th in Delhi

Feb 11 Calcutta
12 Hongkong
14 Jaipur

TAIPEH - FEBRUARY 14:

Met by Dr. & Mrs. C. H. Yen, Dr. Robert L. Cherry, Dr. Pennington, Miss E. Brackett, Stephen H. U. (Namru II), Dr. C. T. Ch'en, et al.

Dr. C. T. Ch'en is now head of the Malaria surveillance service:

Reports---	1956 : over 400 cases
	1957 : over 400 cases
	1958 : over 600 cases

But 1958 is first year of new surveillance program.

We got rooms in the Jade Phoenix Wing of the Grand Hotel. Learn Dr. Oliver McCoy now Head of the China Medical Board is in town. Capt. (Dr.) Robert A. Phillips is head of Namru II.

Reception at Home of Robert Leslie Cherry ICA; Haralsons, Neufeldts Pennington, Brackett, Oliver McCoy, Dr. & Mrs. C. H. Yen, General Fang, Nurse from WHO (Scott), C. T. Ch'en.

Dinner at Grand Dragon Restaurant in Grand Hotel: Dr. & Mrs. C. H. Yen, Sopers, Watson, McCoy, Stephen H. U., Pennington, C. T. Ch'en. One dish after the other ending with soup. Then immediately everyone went home.

TAIEPH -- SUNDAY, FEBRUARY 15:

Capt. Robert Allen Phillips of Namru II calls and takes me to see his installation in a large brick building which was previously the nurses' residence; it seems that a committee consisting of RAP, James Shannon and three or four others looked over the situation here in 1954 and decided this was a place the navy should have a research centre. Namru II which was originally Tom River's unit with headquarters first at the RI and later in Guam was reactivated for service here. At present, there are seven professional staff from the Navy, a group of eight professionals from civilian life and places for a number of local persons. Balance include clinical, various parasitological and bacteriological research of all kinds with a number of fellowships open to natives of the countries of Asiatic origin. RAP says, he has been able to make very satisfactory arrangements with the local Government for working space and conditions for handling such cases in hospital as Namru may want to study; everything is clear except where this all ties in with the local medical training and with the future development of the area. Return and spend the afternoon and evening at the hotel getting some much-needed rest and getting ready to travel with reduced baggage to the south of the island.

FEBRUARY 16 -- MONDAY:

Dr. Robert Cherry of ICA furnishes one car and with the other of the malaria service, Drs. RBW, C. T. Ch'en, Juliet and I leave the city of Taipeh about 9.45 a.m. after spending sometime at the foreign affairs headquarters trying to get permits for leaving the country for Juliet and RBW. The day was spent visiting two health centres where we asked about the number of malaria slides taken and examined last year in the areas representing to give almost a million population. In the first group of 450,000 population only one positive slide and that from a person infected in a known focus of malaria. The only focus found in this NW part of the island is among some of the aborginees where some six positive slides were found among the population of 7,500 people. These 7,500 people are having their homes sprayed every months and are getting monthly treatment for malaria in an all out attempt to end this focus. In the late afternoon, we stop at the new capital of the province of Taiwan and call on the Governor whom RBW had known as a military person some years ago. At Taichung, where we have lunch and where we later visit the office of Dr. C. H. Yen, Dr. Kuo his assistant seems delighted to see me again and tells me how much I simplified his small-pox problem by suggesting that he should undertake to vaccinate one-third of his population every year instead of all of it every third year! This controls small-pox adequately and gives him an even budgetary distribution of funds each year as well as steady employment for his staff. To a little hotel on the hill to spend the night.

In discussion with RBW as what should be done by RF or other interested parties, I point out that there are two sides to each eradication problem and that many things should be tried on a large scale before being undertaken on a world basis. It would seem that there is need for an eradication centre or group to study and develop information needed for future eradication programs before the world finds itself hooked with other programs in the way it has to become committed to eradication of malaria.

Taiwan was visited in 1955 in November when the rice was being or had been harvested; on this trip in February, one is surprised to see so much of the land flooded getting ready for the planting of rice. Near Taipeh, the planting has not yet started but as we come south, we find first a little planting going on and by the end of the day came to areas where the wheat is almost ready for harvest and most of the rice has been planted. We also came into areas of corn and sugar cultivation. All of the agriculture is in small fields and carried out in such a way as to require the utmost in hand labour. ICA car lent by R. Cherry was released at Taichung with documents signed and with # 20.00 tip.

FEBRUARY 17:

Leave the hotel on the hill above at 09.00 as planned and spend the day until sometime after 15.00 in reaching the headquarters of the RF malaria program beginning in 1946. C. T. Ch'en digs up an old board with Robert Briggs Watson's name on it. The front door still has a sign declaring it to be the residence of the WHO malaria team! (RBW examines screens of copper he put on twelve years ago and indicates he and Carter made "with their hands" various improvements such as the plumbing which had been non-existent. To RBW's surprise, there is now a hot water heater for the bath). This building is typical Japanese with sliding paper doors and was originally built as the residence of one or two of the priests who were attached to the nearby temple. The electric lights and the electric fans in the bedrooms give a modern touch to it; but this was fairly primitive at the time Watson and Carter took over. Later J. H. Paul was here for a time and eventually the Pletsch family all lived here. May be this isolated building surrounded by rice-fields gave Mrs. P. the desire to live in the USA and bring her daughters up there rather than take them to Mexico when Don moved down some three years ago. Lunch was taken at a restaurant which makes an attempt at European dishes and serves food with knife and fork rather than chop-sticks. The combined men's and women's toilets soon disillusioned Juliet as to the extent of adoption of the western notions.

FEBRUARY 18 -- WEDNESDAY:

368 township health stations; 22 county health centres; 150 township health stations have trained microscopists but only 27 special stations are receiving slides from the surveillance service. (1) Surveillance section is in charge of Assistant Director; as 110 full-time slide collectors and 402 part-time blood collectors who put in two to ten days per month. (2) Epidemiology section; follow-up each month for 12 months of all cases or foci found. If negative for 12 months, it is considered of no more importance. (3) Laboratory section as 50 microscopists working here at Chou Chou. Now, people examine 80,000 slides a month here and another 20,000 at outlying stations. (4) Military malaria liaison section is responsible for surveillance among troops since civilians cannot come into the military installations. Twenty-seven doctors and technicians from the military service are now attached for work with the institute. Three cases found in military personnel last year; these were among recruits. (5) Entomology section: 2 entomologists, 8 assistants and 12 junior technicians. (WHO furnishes money for 170 persons for the program here, 10 of the 12 technicians for entomology being WHO/MESA.) (6) Engineering section. Over all training and logistics, book-keeping etc. (All DDT used is now made on the island). (7) Administrative section (8) Parasitology section. Filariasis studies also carries out.

CHAO-CHOU

TOTAL BUDGET:

Prov. Govt.	2,500,000	
Local Govt.	800,000	
ICA	960,000	
ICA (12 vehicles, 100,000 DDT)	2,520,000	\$ 70,000 USA
WHO	2,020,000	
(\$ 30,000 USA)	1,080,000	
	<u>9,880,000</u>	@ 3,608 to 1 USA

110 full-time slide takers for between 1,000 and 3,000 population for which each is responsible; (a) for visiting once a month and bleeding of persons having fever during previous month (the same is true for schools) children less than 24 months of age are bled every three months and everyone is supposed to be bled ~~to~~ at least once a year. These men were put on the job last July but only in September did they become fully effective. Some 460,000 blood slides were examined by the end of January 1959 with the finding of three foci not known before. The supervision of the slide takers seems to be inadequate by our standards; as also it seems there has been inadequate supervision of the DDT spraying. CTC admits that some of the continuing foci of infection are in areas with scattered houses; an independent survey made by the engineers showed that the occurrence of cases could be correlated with failure of spraying or even with failure in finding certain houses. In the laboratory building, we find some 50 girls and men at microscopes; each is allowed to examine only 60 to 65 daily, so this lab can do possibly 65 to 70 thousand per month. All slides come to Chauchaw and after preparation about 20 per cent are sent to other labs for exam. (False positives with parasites of Pl. Innui (monkey malaria) are inserted from time to time.)

RBW is not happy over the return to the Japanese method of staining which RBW believes will cause a number of positives to be missed by masking by shells of RBC.

<u>SPRAY</u>	7 men	<u>1 foreman</u>
		4 with pumps
		2 helpers

Township — Head-foreman for 3 to 5 spray squads.

County Supervisor — may have upto 32 head foreman

Spraying covers 2 months period — County supervisors are full-time only immediately before, during and after spraying period. Overlapping etc. — Period ranges from March to October. Period determined by convenience of labour staff rather than epidemiology.

Supervisor is not responsible to Malaria Institute. Townships are charged for work done on a percapita basis.

Now TAMRI is fully responsible for work done in active foci of which there are four. In the principal focus of 9,000 people, there are 16 workers; (a) monthly survey with blood samples (b) semi-monthly single dose treatment of everyone whether infected or not (c) treatment of confirmed cases. (The house spraying is done by other personnel which comes in from outside).

FEBRUARY 18: CHOU-CHOW SUMMARY:

From the discussion today, it becomes apparent that the man in charge of the malaria work believe there are only about 125,000 people living in dangerous areas and another 125,000 in potentially dangerous areas; these areas are all in the foot-hills and mountains where housing is poor and of a type which does not retain DDT, where populations tend to be temporary, where houses are scattered and easily missed by the spray crews, where climbing causes shoes to wear out faster and where supervision is most difficult. Only four foci areas are now known and CTC does not expect many more foci to be found. He finds it hard to explain why he is now using treatment while still recognising that 95% of the island was successfully cleared of malaria without Rx.

The entomologist is not happy with my suggestion that he is discovering a new type of malaria transmission, namely, transmission without vectors and vaguely talks of possibility of A. maculatus. RBW mentions at first possibility of a. leucosphyros which is a vector elsewhere but gives up this idea when he learns that malaria has disappeared from areas where he previously found A. a.

At the end of the afternoon, Robert indicates his belief that the difficulties here have been administrative rather than technical and I find myself giving a lecture on the need for supervision and more supervision until the Director of the Services who must take the responsibility of signing the monthly reports can be certain that the work at the end of the line, that is in the houses, has been done. CTC has no answer to my query as to what will be responsible for the disappearance of malaria when it disappears under the impact of DDT every four months and Rx every two weeks but tends to defend his action by saying that many of the malariologists of the world are now favouring the double attack on malaria. I indicate this is a sign of weakness and lack of faith in their own administrative services.

FEBRUARY 19:

All day on the train back to Taipei.

During the day, I learnt from Dr. Ch'en that Dr. George MacDonald is to come to Taiwan in February 1960 for six weeks to look over and evaluate the surveillance program. GM's visit will be preceded by a two month's survey by Dr. Isseres, entomologist, of the WHO. Also learn Isseres and McDonald were out last year.

FEBRUARY 20:

Visited the medical defence center; Drs. Chow and Fang show a very well-equipped plant for training doctors, nurses, and other medical groups needed in the army. (Maximum number of entrance students in medicine is 80 chosen from some 700 applicants; only about 45 of these 80 ever become doctors). Lunch with Miss E. Brackett; called on Robts. L. Cherry.

N. W. Air to Manila; met by Calbourne, Dy, Hargreaves, Etchavez, Lipton, Turnbull and Prof. Chow.

FEBRUARY 21:

Sit the morning out with Colbourne and Chow discussing malaria situation in the P.I. Ejercito had a stroke about a month ago and in any case is out of the picture soon because of retirement; health section in hands of Menezes? is at about the same age; so, young blood has to take over soon. Colbourne has had experience in West Africa and in Borneo before coming here as regional consultant for WHO; knows Bruce-Chwatt and is apparently trying to copy BC's beard! Malaria in P.I.; four situations, (a) no malaria, (b) malarious areas now free because of program, (c) malarious areas still dirty inspite of program and (d) malarious areas which have never been worked because of difficulty of access.

Resistance of authorities to continuing budgets after malaria has been greatly reduced is apparent; why spend on non-existent malaria when there is so much to be done for filariasis? Insecticidal resistance has not been found to be of importance here. Notes on notes furnished by Duck Egg Chow: Pre DDT situation; (a) normally two million cases with up to 20,000 deaths, during World-war II over 4,000,000 cases annually. (b) Economic losses from \$ 100,000,000 to \$ 750,000,000 pesos annually (c) Endemicity not high, spleen rates of over 50% annually in the Province of Palawan, little malaria in long-settled and heavily cultivated areas, more in areas of mixed conditions and high in foothills and newly settled undulating areas. (d) normally not found above 700 meters. (e) 33 species anopheles; A. minimu flavirostris is main vector; A. mangyanus secondary vector and A. maculatus and A. balabensis are potential vectors (f) A. min. flav., slow moving waters; streams, seepages and rivers with grassy edges; peak during September to December lesser peak June to July; resting places more outdoors than indoors; outside 91.5%, indoors 82%; feeds mostly on domestic buffalo; comes to houses mostly between 10 p.m. and 2 a.m.; leave 5 to 6 a.m. (g) A. mangyanus important vector in newly opened jungle areas; never met in long settled areas. (h) Plasmodia: normally prewar picture (1928) 75.5% vivax 26% falciparum and 0.5 malariae. During the World-war II, falciparum predominated but post world-war II, vivax became 71.2%, falc 28.5% and malaria less than 1%. (i) Discontinuation survey Sept. 1957 March 1958 of areas sprayed for four consecutive years; 507,000 bloods from individuals, children one to four years and fever cases (of these 244,472 had been examined by June 30, 1958, 760 falciparum (74%), 236 vivax (23%), 10 malariae (1%). The falciparum infections were distributed throughout the reporting field units with high prevalence in those areas immediately adjacent to resettlements (j) Epidemiology moderately unstable; peak years 1925, 1930, 1938 and

World-War II 1942-47; zoophilic anopheles causes need for high density for transmission. (k) Epidemiological survey and investigation: (1) "Non-malarious areas" 14 million of 22.5 million believed to be in non-malarious areas need survey to be sure. (2) "Continuation areas" three million live in areas where residual spraying has gone on for 4 to 5 years in spite of which some malaria transmission still occurs; teams of epidemiologist, one entomologist and two technicians have been recommended by George McDonald. (Epidemiologist and Entomologist are to have six months fellowship of ICA to study elsewhere during 1959 and then return to plan and train for the P.I.); duties of teams are to (2a) determine origin of malaria cases as sporadic, imported, induced or introduced. (2b) To determine if total coverage has been carried out; (2c) Bioassay of residual effect of insecticides (2d) Insecticide susceptibility tests with local anopheles (2e) Observe survival rate of captured mosquitoes from sprayed houses (2f) Bionomics of vectors (2g) Cultural characteristics of population which might interfere with action of insecticide (2h) To determine secondary vectors if present (2i) To recommend counter-measures to get final eradication (3) "Discontinuation areas": as "inaccessible" areas become accessible they should be surveyed to determine where they are malarious or non-malarious. Selah Chow has spoken!!!

FEBRUARY 23 -- MANILLA:

Morning visited the WHO and to the Malaria Service where we find Dr. Villanueva acting for Dr. Ejercito who had a stroke some weeks ago.

Afternoon meeting with Drs. Dy. John McDowell, Etchavez, Poulsen --Hansen and Prof. Chow. Dy gives summary of developments on malaria control here. The first real post-war control was in 1952 with Dr. Sambasivan of WHO on Mindanao; this pilot project was highly successful. Philippines with ICA was written and signed in March 1956, four months after my visit here at the end of 1955. George McDonald was here and made recommendations for surveillance program after about a month in the country but after Peter Issaris had made a several month's survey. MacDonald and Issaris were working together and are especially McDowell emphasizes the question of settlements in the forests: both the official resettlement and those under individual interests working on the problems of surveillance and disappearing malaria. The recommendations made by M and I have been followed very closely "and that is why they are so expensive" (words of F.Dy). Surveillance is used wherever discontinuation of spraying occurs. Present plans call for a report on the situation here with a final plan of eradication to be prepared and agreed upon by the Government, WHO, ICA, and UNICEF.

Dy. believes that while malaria incidence has been greatly reduced in the cities and towns that there is still some transmission in certain areas. Dy does not believe that DDT has been a failure but is rather inclined to believe that failures are in large part due to failure of administration. McDowell believes that problems are chiefly those of resettlement and aboriginal tribes.

1953 survey of spleens indicated 1,200,000 households involved; 1954, 1955 the same figures; 1956, with eradication program 1,400,000; then 1957, 1,490,000. This was fourth spraying for 1,200,000 houses. (Of 1,200,000, 1,060,000 houses could be excluded from spraying i.e. there were almost 200,000 houses which were thought to be in areas with continued transmission occurring). At intervals during 1957, a survey was made of fever cases, of individuals and small children; on three surveys of 1/3 of houses each time, there were 420,000 slides taken which gave 0.42% positives.

Mesa surveillance began July 1958. Only 328,000 of 600,000 houses in crosshatched areas were sprayed (see map 1.). This year, about 426,000 houses are being sprayed. It is believed that 600,000 houses should be sprayed until 1962. Thirty malaria units each with a doctor as leader: official government surveys; with some three or four sub-units in certain areas. Doctor, malarialogist, one engineer, one or two foreman and technicians for each sector.

\$	3,460,000.00	US	
\$	14,600,000.00	Pesos	- of what has been counterpart
(\$	1,850,000.00		funds -- rest from Government

MCD emphasises the question of settlement in the theories; both the final resettlement and those under individual initiative.

FEBRUARY 26TH -- COLOMBO:

Discussion in office of Dr. Viswalingham who is taken over from Dr. Gunaratna who died a few months ago. 1934-35, 50,000 deaths in less than six months; more than 70,000 for the 12 month period. V gives us his Report on Activities of the Anti-Malarial Campaigns, Ceylon of 15.1.1959. In the intermediate ^{zone} ~~home~~ surveillance is more related to persons ^{and mosquitoes} rather than cases of malaria. I raised the question of doing the same ^{thing} in the Hyperendemic zone, i.e. doing surveillance of houses in A. Gullifacies areas. In other ~~areas~~ ^{areas}, what I am suggesting is to concentrate on insecticide rather than on treatment. (Dr. Weckramsingh and Dr. Weerasooriya, doctors in the malaria services in Colombo.) ~~Dr. Kahawita, Director of Health~~ ^{where} more cases reported for 1959 than we had anticipated but all are charged ^{up} ~~much~~ against infection from the dry zone.

The morning was devoted to visits with DKV to Dr. Viswalingam, the Director of Malaria ~~Service~~ Service, Dr. Kahawita, the Director of Health and ~~the~~ ^{to} the Minister of Health Madame V (?). We learnt that the WHO is financing a study here of ways and means of surveillance using a population of 100,000 people in the dry zone for a period of two years. The Planops has just been signed; some of the microscopists are already here. There are to be 14 men in the field collecting bloods from fever cases in some areas at intervals of two weeks, in other areas at intervals of four weeks, in others at six weeks and in still others at intervals of eight weeks. In addition to this a certain population will be able to

be completely

~~completely~~ so as to give an idea of what is actually happening in the blood without reference to the production of ~~the~~ fever. There are to be eleven micropists to examine the estimated 600 slides taken daily. After visiting Dr. Kahawita, we called ~~on~~ on the Minister and (1) insisted ~~ed~~ that she should come to Delhi for the Malaria Conference in March and (2) talk about the necessity of spending enough money to get rid of malaria once and for all time in Ceylon (3) emphasise the fact that the easy part of the job has been done but that malaria will continue until the Chenas and the outlying areas are taken care of (The minister seems surprised that there is any difficulty in ~~countering~~ the houses since it is the obligation of every village headman and every forest ranger to know all of the houses in his area~~s~~ and all of the island has been assigned to one or the other of these officers) ~~9/~~ To the Indian Embassy for reentry visa; of course three pictures are required of RBW and JSS before we can get clearance to travel. This takes most of the afternoon.

FEBRUARY 27:

Colombo to Polanoruwhe in Dr. Vish~~h~~walingam's Consul (English Ford) with the DKV, RBW and the owner driving the car. A stop was made at Kurunegala to make arrangements for the housing of the micropists (10 or 11) who are to work here for WHO ~~with~~ some pictures taken here. On to Polonaru~~h~~we where we decided ~~to~~ to spend the night. I drive on up with the 2 V's to make arrangements for office and living quarters for the group of field workers WHO are to take bloods for the WHO study. At the end of the line, we met the inspector responsible for vigilance in this area. In answer to a direct question, he says it should be possible for an inspector living and working in a district to know about all of the chen~~as~~ and plantations and wood cutters and other invaders of the forest areas!!!

FEBRUARY 28:

Got pictures of two spraying units, one with a little jeep and one with a weapon-carrier with more men and more pumps. His pumps are of the Kuapsack ~~type~~ shoulder type with the over the shoulder low-pressure lever pump handle. The nozzles are a conical type which are ~~not~~ really not satisfactory for DDT spraying!! Also got a picture of an elongated jeep modified for carrying pumps as well as men. We visited a chena area in a rather wild forest where the workers' refuge is a nest in a tree about 30 feet from the ground. DKV completes arrangements for housing ~~af~~ field workers of WHO in this outlying area. The question which constantly comes to my mind is why ~~in~~ not spend more time hunting houses and chenas that ~~has~~ ^{had} more surveillance of missed houses rather than trying to find and treat every infected case? Todate, the premise ^{that} with DDT ~~spread in the~~ sprayed in the houses will result in the interruption of transmission has not been proven false and yet we see an enormous drive to find cases; so these cases can be treated as well as their contacts. Should cases not rather be searched for in order to find where transmission is occurring? I believe, a fundamental study should be made here of the basis of eradication: can eradication be ~~done~~ ^{achieved} by hunting out and treating cases or must it be done by interrupting transmission? During the trip, we got a good ^{administration} of a one-man administration with the Director looking after ~~Every~~ minute detail. I tried to point out some of the defects in the method of coverage by ^{arrastaa} ~~arrastaa~~ but got just exactly nowhere! Arrived back at the Galle Face hotel in Colombo at about 18.30 O' clock.

MARCH 1: CEYLON — COLOMBO:

Spent the morning packing and paying the hotel bill; the latter took more time than the former. Afternoon plane to Madras where we are met by a driver and car from the Shell Oil Company. To the Connemara hotel for the night. (Mosquito nets used by JSS for the first time in many years; these are essential because of filariasis in Madras).

MARCH 2:

Indian Airways to Bangalore (DC3). Very good chance to see Deccan plateau with some pictures taken. (We are met in Bangalore by Drs. Chandrasekariya, now retired from position of Director of Health of Mysore State, H. Shama ~~S~~Mastry, Director of Malaria ^Eeradication for the state, ^{R. Ranganathan}~~Ranganathan~~ who remembers me from ^athe 1950 talk ~~on the occasion~~ at JHU when he was a fellow, and ~~Dr.~~ Dr. K. R. Venkatesan, all old friends of RBW and by ^{CHAP. LAKKAKA}~~Lakkaka~~, a Parsee friend of RBW who is said to be more British than are the British themselves.

Later at the Hotel we met Dr. Junglewalla, the Director of the All India Institute at Calcutta. We also met Dr. Yestee Rodda, the Director of Health and called on the Minister of Health of the State, [?] who is a physician, not with PH training but who seems to know pretty well what is going on.

The trip to Poona seems to be more difficult than anticipated with the result that plans are changed to ^{at} ~~at~~ Mysore State ^{NW}, leaving Poona for another occasion. (a/c)

Receive ^{note} note on the progress of the Working of National Malaria

Eradication Program in Mysore" from Dr. Shama Shastry.

Outdoor dinner at the Victoria hotel with all of the ~~Dr~~ doctors named above and half a dozen more. Discussion ^{rose} ~~rose~~ to eradication of malaria, ^{leprosy, tuberculosis} ~~etc~~ and to planned parenthood.

Juliet takes her first step on the downward path as a ^{BETEL NOT} ~~battle not~~ chewer!

MARCH 3RD:

Day in Bangalore; morning with Dr. Shama Shastry; at 3.30 to the Health Department and at 6.30 to dinner with Lal Kaka, the Parsee, who had also invited Mr. Mus. ^{He is of the USIS who lives here}

MARCH 4TH:

Leave Bangalore at 9.00 O'clock ^{by station wagon;} lunch on sandwiches and drive on to Shimoga where we visited the laboratory for virus studies and where I am asked to sign the first card for a mouse group injection. Anderson and Trápido are in the area at the moment and we should see them this afternoon or tomorrow.

Photo taken with the following persons present: JSS, RBW, H

Malaria in Shimoga — Discuss malaria situation here which is said to indicate that all cases found have been infected outside the area. We drive to Jog Falls where the falls have ^{cut fall over} ~~flow~~ 900' from top to bottom; the face of the cliff is said to be the nesting place for hundreds if not thousands of rock ^{PIGEONS} ~~peigons~~ ^{targets} ~~peigons~~ which make difficult ~~targets~~ as ~~though they~~ ^{they} come in at night because of the speed of ~~their~~ flight and sharpness of their drop over the falls on arrival.

See attached notes (21 April 1965)
re 4-11 March and 22 March 13 April 1959

Juliet sleeps on top of the coverlet because the sheets are not unused; otherwise the service is satisfactory and the food acceptable though different from that of three doctors who sit at the table with us and eat ^{vegetable} ~~intelligible~~ diet with their hands. Anderson (Chas) and Trapido (H) came in just before 21.30 and we make talk until after 00.30 in the morning. HT recounts his 1952 experience in Sardinia where he and T. Aitkin spent the summer studying *A. labbranchiae* in a small valley 14 kilometers long where *A.l.* had been found almost three years after spraying had been stopped. The studies showed that one ^{larva} was found on the average for each 1400 ^{dips} ~~types~~; no adults were found at any time even though houses and all possible shelters were searched and traps of all kinds with various kinds of ^{animal} ~~normal~~ baits were employed. It seems difficult to imagine what was happening since according to what is known of the behaviour of the species, the ^{female} ~~family~~ does not ^{mate} ~~not~~ except in the presence of a swarm of ^{males} ~~larva~~. In the absence of all evidence of adults in the area a few larva continued to be found during the summer season. On the other hand, *A. hispaniola* which had been found ^{only once} during ~~the~~ the first 12,000,000 ^{dips} ~~not~~ made for larva by Erlaas is now a predominant species among ^{insects} ~~insects~~ on the island. HT points out that someone has termed the impact of DDT on certain species of insects ^{as} ~~is~~ equal for its effect ~~has not~~ on the development of genetic ^{pressure} ~~process~~ to the Pleistocene ~~back~~ geological age. HT points out ~~that~~ a species may be expected to ^{fail} ~~fail~~ up and disappear under a certain type of ^{attack} ~~back~~ which is adapted to its habits in the periphery on its range where a relatively poor strain may be ~~xx~~ present: H. T. ~~xx~~ believes on the other hand that the species at its original centre of distribution

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may be much more complex genetically and able to develop resistance and other ~~vectors~~ ^{factors} for surviving ~~at~~ ^{it} which cannot occur at the periphery. Anderson says vaccination against KF disease has not been ~~of value to be of~~ ^{proven to be} but ~~with them~~ ^{that he} hopes to get some figures which may be indicative of its value during the present year. The HF group have offered this year Rs. 3 for a dead monkey, Rs. 6 for ^a sick monkey and Rs. 10 for monkeys from which they isolate virus. The primary and secondary health centres ~~characteristic~~ ^{state} of this ~~study~~ ^{state} ~~has~~ have made it possible to learn ~~that~~ ^{few} people are sick and ~~get~~ ^{get} information that ~~would~~ otherwise have been impossible. KFD ~~is~~ continues to occur in the area where it occurred in 1957 and 1958 but has spread to new areas in 1958-59; apparently the disease is not so ~~new~~ ^{common} and the ~~new~~ virus is more difficult to isolate in the 1957 areas but the virus is still there. KFD apparently infects ~~a large number of~~ ^{many} species of animals and birds; ~~and the~~ ^{and the} monkey don't seem to have any ~~significant~~ ^{significant} function in maintaining the virus. Its importance is due to the fact that it is susceptible and its death is noticeable. Cattle in the ~~new~~ ^{known} infected areas have positive bloods ~~till get~~ ^{but cattle} outside the known areas ~~for~~ ^{have} negative ~~new~~ bloods. Both man and ~~the~~ monkeys seem to be accidents and not an important factor in the ~~epidemiology~~ ^{epidemiology} of KFD. HT says this may be the first time ~~this~~ virus has been in this area and that it may have come from Malaya but that the story is ~~that~~ complicated by ~~recent~~ ^{recent} evidence of ~~smaller~~ ^{similar} viruses in Sweden, ~~Irish~~ Ireland, England, ^{Canada} and Czechoslovakia where there are no monkeys and where the disease ~~is~~ ^{has} apparently long been present without ~~evidence~~ ^{having been} recognised. HT believes on the basis of studies here

MARCH 8, SUNDAY — VISIT TO COORG — TOWN OF MERCARA : DR. AYEPA

This is the state from which the best warriors come probably because of the mixture of Arabic people. There is a large immigration of labour for the plantations during the crop season. Malaria control began in 1947. Transmission is period just before and just after the monsoon. In other words, transmission occurs when there is some water but not the large amounts which come at the peak of the monsoon. In 1956, the national committee suggested that the time had come to stop spraying. This was done and during 1957 and until May 1958, no cases were found. Then there were clearly an increasing number of cases found in the tribes. Immigration labour is blamed. Cases have all occurred in southern area among tribes of aborigines. This is an apparent example of a reinfection of an area thought to be clean but on discussion, Dr. Ayepa comes out with the statement that he believes the work was never properly done in the aboriginal tribes. One-third of the state has been put under spraying again. Cases have been found among population groups of about 20,000; spraying has been started again among 40,000 people. Total population of Coorg 2,30,000. "From the investigations conducted so far, it is known that the infections are confined to tribal people and labour populations with evidence of spread to locals". (Tribes 30, Labourers 20, Local population 8). Cases have occurred in Srimangalu and Gonicoppal circles. In the group of 60 random slides taken from tribes, 16 positives were found who gave no story of infection nor of fever.

MARCH 9:

Morning at the palace. In the afternoon to K.R. Nagar. Previously highly Hyperⁿendemic area. Malaria associated with irrigation and A. fluviatilis. Doctor here gives a categorical yes when asked if he believes that malaria has been eradicated here. No local cases for three years and only one case of any kind found last year; this case was in an engineer who had been out of the district on leave. Here ^{there seems} ~~transmits~~ to be a stable population without forests and without ~~immigrating~~ ^{it} labour.

Bondipur last night. Morning trip in the forest to see and film animals after which I rode the elephant to the tune by ten RS. Drive with Dr. Bhombore and HSS to Coonoor where after a bath and lunch we came to Malaria headquarters at the Pasteur Institute of South India which dates from 1907. Office here is one of the six original offices for the malaria service. Three states here, Kerala, Mysore and Madras. Dr. Bhombore gives us a table of data. (which see). B says he came here in December 58; has a French parasitologist and an American entomologist with one foreign technician who are beginning to study mosquitos and parasites in dry area towns where spraying has never taken place for a check program of WHO. (RBW and I have somewhat the same impression we had on encountering at Mysore the Indian doctor from South Africa who has been in India almost a year without doing anything at all).

RBW asks Bhombore and HSS what reaction could be expected to the suggestion in a combined program for India -- for the three states of Mysore, Madras and Kerala. Then to the Hotel for tea and further discussion. (I point out to RBW that what he has seen here explains why I am not enthusiastic regarding the possibilities of getting program of WHO financed by RF). At the Hampton Hotel, we have tea and get HSS's ideas of what more he needs to put on an ideal program of surveillance in the present state of Mysore. Among other things, there comes the request for 400 jeeps and microscopes and slides and personnel to the extent of about \$ 66,000 USA annually. All of the requirements except the jeeps might conceivably be gotten but 400 jeeps are just not going to be found in addition to what he has. I cannot forebear bringing up once more the cost of surveillance as being planned here and in certain other parts of the world and point out that I have considerable faith in sampling and in continued negativity where one is sure the work has been done. I believe, we should have faith in our ability to find malaria and also should have faith in the ability of the organization to blot out any reinfections which may occur without the necessity of sampling of blood from all fever cases every two weeks! HSS discusses once more the failure in Coorg and insists that it was not ready after eight years of spraying under the National Malaria Institute since the work was never properly supervised and checked. It was interesting in Coorg to note that only in the southern part of their range were the aborigines continuing to have malaria. This indicates that the work in the other area was better than in the south. When RBW asks HSS about the future of the men to be hired now and the 400 vehicles (jeeps) which are not to be needed after eradication is over, he is told that they can be used in other programs of eradication in the state. I came up with the suggestion that there should be a pool of materials and men formed to work from state to state in India until the entire country is free of malaria!

MARCH 11:

Had a nice cool night at the Hampton Hotel which is at an altitude which makes for delightful climate at this time of the year. (Paul Russell lived here at Coonoor for some time while in India). Drs. HSS and Bhombore drive with us to Mysore where we dine with a number of doctors as the guests of Dr. Chetti, the Indian from South Africa who is with the World Health Organization and who speaks out very freely regarding conditions in Africa as against conditions in India. C is third generation, that is the second born in Africa; his grandfather was indentured for two years and then given the choice of repatriation or a chance to remain in South Africa with a small piece of land. He remained, got into business for himself and the family has prospered. In spite of the racial difficulties in Africa, C says Indian worker in Africa is much better off than anyone of similar position here. (I am surprised that C speaks so freely in front of the Indian doctors with whom he must work during the coming months and years, especially since no one had asked his opinion on the points he discussed.) (Photo of Indian doctors at the lunch taken in front of the Hotel just before we left.) Stop at Mandya where the school for malaria workers was inaugurated with RF help some years ago. Dr. S. Rao, the present Director was trained at Harvard and was never trained as a malariologist.

The school is spread out in small separate buildings over a large plot which makes for high initial cost on construction, then difficult administration and consequent disorder. The present Director took over from HSS; he talks rapidly about many minor difficulties which he has not solved himself but which he seems to think Dr. Watson, as representative of the RF should solve for him. RBW does not get interested in helping him but points out that all of his problems should have local or at least ICA or WHO solutions. (Photo of group including Dr. Watson on steps of main building). Stop at health centre where RF Fellow is in charge; picture taken of this Fellow with the signs of the health-centre and of the Government Family Planning centre; also with the sign with his name. During the day RBW asks me about the fiasco of our Brazilian joint effort of 1957: I give no added details other than to assure RBW again that what I did was done in good faith and that I was greatly surprised when I learnt of President Rusk's reaction to the situation. RBW says he received a two page cable from President Rusk stating that the RF would not, repeat would not become engaged in the administration of the program in Brazil under any circumstances. RBW enlightens me with information that his cable was shown to Davee the day after its receipt and that it was on the basis of this cable that UNICEF decided not to have any part in the Brazilian malaria eradication service! Arrive in West End Hotel in Bangalore at 18.15 — completing just eight days on the road without stopping; a most interesting trip in which we have travelled some over a thousand miles.

MARCH 12 - 13:

In Bangalore — official visits to HSS and to Director of Health.

MARCH 14:

Fly to Delhi with transfer in Hyderabad to the Janpath Hotel.

MARCH 15-SUNDAY:

1. Met Dr. Woods, once with the PASB along the border between USA and Mexico whom I had not seen since 1945 at the Typhus meeting in Mexico City W is now with ICA in Indonesia.

2. Meeting with B.A. Rao, HSS, RBW & FLS

RBW outlines our trip and our objectives and asks if there is anything RF can do to help in India. BA says WHO has studies in three areas in India and another in Ceylon and at first seems to think that this is sufficient. BAR and FLS have long discussion of place of surveillance in malaria eradication: Points at Varia NCE (1) BAR does not feel the need of surveillance as a check on results of spraying operations. (2) BAR uses surveillance only to find and root out final infections; FLS would use to find where transmission is still occurring (3) BAR says there is still 5% of positive in the Punjab three years after a big epidemic whereas FLS shows figures for

a. gambiae infected area of Brazil for 1939-40-41, namely 65.5, 9.8 and 0.45%. (4) BAR still believes in infant parasite rate as index of stoppage of transmission although it has been found wanting in Taiwan, Ceylon and elsewhere. (5) BAR says that RF if going to work in India should do so in agreement with the National Government rather than with states or with WHO.

3. Learnt from MFARID (a) that malaria in lower Egypt showed an increase near Cairo in 1958 and hence is now getting some attention (b) that there is some malaria in Fayum area but that the oases of the Western Desert are apparently free although A. sergenti did, after an absence of three years, reappear in Dahkla apparently reintroduced from another Oasis. (c) That Jafar is still Director of Health in Pakistan and just as determined as ever not to do anything about malaria but that the Minister of Health may have different ideas. CAA is to stop there after the conference to discuss matters by special intervention of the Minister since Jafar would not have recognized the convenience of CAA's visit.

MARCH 16:

Inauguration of the Third Asian Malaria Conference which C. Mani refers to as the First Asian Malaria Eradication Conference since the previous two conferences were for the Control of Malaria (To hear CM state publicly that Malaria eradication is within our grasp is an important index of progress). Prime Minister Nehru opens the Conference with some remarks on the effect of Malaria on the course of history and a statement that malaria is worse than many diseases which kill outright since those who are not killed are all too often enslaved.

Indonesia sent a letter to CM against representation of Netherlands here. CM refuses to read the letter saying that this is not a meeting of Governments but of participants and that there is no reason to bring political problems to a technical meeting. Soeparno insists and does read the letter himself. The representative of Netherlands (Metselaar) replies that Netherlands is sovereign there. In his talk, the Minister of Health Sri D. P. Karmarkar says that if we are to take credit for malaria control, we must also take blame for the malaria which still exists (Ideas if good do spread!).

Afternoon meeting. The Minister of Health of Malaya in the chair; at the top table Don Johnson, CAA, Colbourne and the two rapporteurs. The meeting had hardly begun when DKW told the chairman to ask me to talk which I did to the extreme of giving something of the history of eradication and what happened in Aa eradication.

Then some words from Don Johnson, Mr. Davis of UNICEF and CAA. The representative of Indonesia (Soeparno) says that he has difficulties in getting his government to accept the idea that ICA can give guarantees only year by year and not for the full course of the eleven year program. I got dragged in again by Don Johnson to help tell what will happen with regard to US aid. I said Indonesia's problem of getting funds from USA will be solved by what happens in Indonesia rather than by anything anyone can do in the USA.

After the meeting CAA tells me I may be named honorary President of the VOP's. My answer is that in 1939, I received a telegram from Maneco and Bruce Wilson signed "2 other VOP's". The Allens and Peg Balfour came by and took us to the party at Patiala house! An outdoor party in the grounds with the moon overhead, since at this time of the year, it is possible to plan without the risk of rain. Talked with the Minister of Health of Nepal and got a very good impression of his orientation regarding malaria eradication. Talked with Dr. Barkat Narain of India who seems to be in charge of the organization of integrated Health Services throughout the country: Narain defends the policy of thinning out centres responsible for 60,000 persons or twice as many as can be taken care of. Narain says his hand is forced by the development of integrated community services in which health is only one element.

MARCH 17, 1959:

Malaria Board: Afghanistan, Burma, Indonesia, India (J. Singh), Viet-Nam. J. Singh tells what is happening in India; B. A. Rao is Director of the Malaria eradication program but is not the Director of the Institute where S. P. Ramakrishnan holds authority. JS says everything is working well, a statement which is denied by RBW. Health Minister of India and DK both discussed the ideal and the practical types of organization ranging from military vertical service to fully integrated services with details all carried out by regular health services.

MARCH 18:

Lunched at the Gymkhana Club as guests of Secretary V. K. B. Pillai. The Minister of Health, Dr. John C. Hume, Mr. Howard Houston is head of US TCM, Dr. Mani and 20 other people were there. The Minister seems to be a very intelligent if ruthless individual. Spend the afternoon visiting the All India Institute of Medical Sciences with Dr. Lucien Gregg and B. B. Dikshit. In the late afternoon, visited the Indian Council of Medical Research, of which Dr. C. G. Pandit is the Director. Interesting discussion regarding plans for eradication of small-pox in India; also discussion on problems of cholera and plague. Apparently the problem of cholera is very definitely related to the East and West Bengal areas as endemic centres. Pandit is responsible for the publication of a paper suggesting the possibility of Hilsa fish taking part in maintaining cholera vibrios for human consumption. We missed the party given by the Minister of Health because of a failure to get the invitation which was posted addressed to the RF without any indication even of the city. The morning today was spent visiting the Malaria Institute where Dr. B. A. Rao gave a talk on the institute and on the program for eradication of malaria following which we visited various sections. One of the interesting thing going on here is the genetic work in which an attempt is being made to link a spread-wing mutation with gene responsible for resistance to insecticides.

MARCH 19:

Lunched at the Ashoka Hotel with Minister Sambantham from Malaya and Dr. Din. The Minister asked Drs. Watson and Soper to comment on plans for a pilot project in his country. Between us we suggest that the pilot project is too small (only 5,0000) people especially so since it has no defensible borders on two sides. We suggest that the idea of a small pilot project with areas of all five factors is not a sound one since in Venezuela, there have been found two almost contiguous areas in which a. acuasali behaves in different manners; in one area DDT gives good results, in the other area it has failed!! I insist that the pilot area is Malaya and that whatever work starts on a small area that area should immediately be considered as a training area for the rest of the country. (Later in discussions with Dr. Colbourn, I learned that he had accepted the pilot project program for Malaya as most he could get since Dr. Reid of the Institute has been opposed to any all-out attempt to eradicate malaria in Malaya. C says he would welcome a visit of mine to Malaya if I could put on pressure to get faster action on building up a national program. (While we were talking to the Minister, he indicated that it would be very difficult to get Malaya begin its eradication program in the pocket next to Thailand border since Thailand has failed to collaborate with Malaya in the suppression of communist activities which have continued as long as they have largely because of the open border areas through which they have operated). Later in the day, I have a chance to talk with Reid who says that his opposition to an all out campaign of eradication is based on studies in which he participated some years ago in which four areas were taken having operations of about 1,000 people each. One area was treated with drugs, one with DDT, one with BHC and one was left as a trial. From a malaria rate of 30% in each piece, the rate dropped in three years to 3% in the DDT area and only 2.5% in the drug treated area. Mr. Reid was entomologist who has been at the institute a number of years and is now serving as Director, but expects to retire next year as part of the nationalization of Malayan institutions.

Have discussion with RBW and draw up the following notes of our conclusions as we are talking.

(A) Many areas in Taiwan, in the Philippines, in Ceylon and in Mysore have been cleaned of malaria (in spite of the statement of CAA that real eradication has been recorded only in those areas such as Sardinia, and sections of Venezuela and British Guiana from which the principal factor has been eradicated).

(B) No country or state has been entirely cleaned but in each area, the authorities attribute the difficulties to the problems of population distribution and population movement (immigration, chena farming, aboriginees etc.)

(C) No evidence in the countries we have visited of difficulties due to false promise: Where all houses have been sprayed properly, malaria has disappeared; no evidence of resistance as an important factor in the areas visited. Failure has been due to administrative difficulties rather than technical ones; finding and spraying houses.

(D) Certain of the cleaned areas are large enough to justify the promise that the residual insecticide itself stop transmission and that in the absence of transmission, malaria does disappear.

(E) RBW and FLS believe that tail end cleaning is to be solved by improved administration rather than by hunting out and treating all residual cases of malaria!

(F) The proposal to switch from insecticide to drug therapy at the end of the trial is proving expensive beyond reason.

(G) What is happening in malaria is typical of epidemiology of communicable diseases under attack (also disease features): initial eradication easy but hard core of final cleaning up is difficult because attempt is being made to use single technique for all conditions. It must be remembered that the problems which are difficult are in best in temporary conditions which occur only once but are a routine part of the life of the areas being worked. Therefore, plans must be made to meet the problems which are encountered without recourse to routine therapy.

(H) The solution of the problem of final step eradication is important not only for malaria, but for every disease in which eradication is to be attempted. Problem is indicated by acceptance of term "epidemiology of disappearing malaria" and the introduction of term "epidemiology of a retreating disease" and the "epidemiology of evanescent disease". Important also for animal and plant diseases.

(I) Importance and urgency of problem is increased by DG report in 1960 document presentation.

(J) See no advantage in funds now to WHO unless they could be tied to a program to be carried with personnel selected by the RF and with RF shaping the details of the program (since WHO has already two programs with MacDonald Betol, RF should work independently).

(K) Believe RF to build staff to work on epidemiology of disappearing diseases (cite RF 1 First eradication program (YF)
2 No Aa YF since 1934.

World committed to malaria eradication. We cannot see it fail!!)

March 19

RBW leaves on BOAC Britannia at 20.15 P.M. Farewells at the air-port.

Long talk until after mid-night with Don Johnson: Don realises that Congress has been misled regarding period required for malaria eradication. (1959-60 is supposed to be the peak year!!) The headquarters staff on malaria consists of only three people, Rao, Roy Dritz, Don Johnson, and an assistant, all three of whom share a single secretary. This staff is supposed to be over seeing the spending of 30-35 million a year and prepare budgets and documents and maintain relationships with International organizations etc. etc. for programs which are spread round the world. Harold Hinman is coming to DC to become one of the three regional chairman, Pease and Curtis being the other two.

EPIDEMIOLOGY OF DISAPPEARING DISEASE
OF RETREATING DISEASE

New Delhi
March 20, 1959

Malaria Notes

Many areas clean; no country and no state entirely clean; no evidence of failure because of technical difficulty; resistance not imp.

Areas cleaned are large enough to validate premise that
Interruption of Transmission Results in Eradication.

Difficulties are due to failure to do complete job with adequate checking; administrative rather than technical; failure to get eradication is resulting in switching horses at the end of the trail; so-called evaluation is in many areas a disguised attempt to do by finding and treating residual malaria cases what has not been accomplished by insecticides!

Curves of incidence everywhere show large rapid reduction in malaria cases followed by flattening of curve at a low level. This is the typical "control" curve seen by health workers in so many diseases in so many places in the past six or seven decades. (Eradication curve breaks sharply and continues downward without undue flattening--Flattening of curve means unsolved problems; either administrative or peripheral. (Hidden breeding of A. aegypti.)

Malaria workers are projecting their work for unnecessarily long periods of time--in Taiwan a study of the data shows that this job can be done rapidly from here on out.

Obvious that evaluationists and therapists have taken over

- a. WHO document EB59 called for 75 per cent of spraying costs.
- b. McDonald's influence Taiwan, P.I., Ceylon, India.
- c. Mysore State, e.g., 1 man for 10,000 population; monthly visits.
- d. In Ceylon I finally suggest surveillance for houses rather than cases.

Question: Should search for cases be used to reveal where transmission is occurring so proper correction of insecticidal work can be made or to identify all infective cases to permit elimination of infection by treatment?

Concept of eradication is valid for some diseases and as time goes on, with improvement in techniques and with additional experience in coordinating activities of neighboring states, will become a most important tool (not only for attack on human diseases and disease vectors but also on those of animals and plants!).

Epidemiology of Disappearing Disease

There should be a group devoted to study of possibilities of eradication and especially to study of Epidemiology of a Disappearing Disease.

The area closest to eradication is probably Taiwan.

(P.S. Above notes prepared before visit to Poona (Bombay State) where T. R. Rao admitted an outbreak of tens of thousands of cases last year due to anopheline resistance to DIELDRIN. (65 per cent of 120,000 people estimated incidence at Tanta.)

Both RBW and myself have been reluctant to accept the system of surveillance requiring the visit of an inspector to each house every two weeks which is being introduced in several countries. Such close surveillance is justified by its proponents as a means of finding of residual infection which is then to be eliminated by treatment. (In the Americas, we have advocated using drugs as a bait to facilitate surveillance but have considered surveillance as a tool for finding where transmission continues in order to correct the defect in insecticidal application making such transmission possible rather than as a means of finding all infected cases for the purposes of a radical cure.)

It is surprising that the same workers who have undertaken malaria eradication only because of the introduction of residual insecticides are willing towards the end of the campaign and while admitting that the premise on which the campaign was initially based is valid are willing to switch about and treat infected persons. This switch requires the development of an entirely new organization and a very expensive one.

File: Malaria, Asia
Diary ✓
Daily

FLS DIARY NOTES ON TRIP TO MYSORE, BOMBAY, THAILAND

4 - 11 March
22 March - 13 April

1959

Wednesday, 4 March

Drive from Bangalore to Jog Falls where the night was spent.

Evening discussion with H. Trapido: Trapido believes, on the basis of studies here, that the Russians are wrong about trans-ovarian transmission in the vector; here the ticks do not seem to carry the virus over from one generation to the next.

At the present time numerous cases are being found in humans as well as in monkeys. Tomorrow we shall see some cases in the hospital, on the basis of promises from HT tonight.

It becomes clear during the discussion that there has been some jealousy between the RF workers and the local people with one of the local workers insisting that he had mouse groups inoculated with the virus from KFD cases when the RF group came, but that Dr. Worth refused to do any typing or studying of the virus which was soon lost. HT said that the RF group arrived here directly, inoculated animals and got material on Wednesday which went to Poona on Thursday, was inoculated in animals there on Friday and gave isolation of virus as early as Monday of the following week. Their visit to Bangalore was on Friday, and the Indian doctor in question did not show animals nor ask for help on typing any material he had.

Thursday, 5 March

Inspection of Shaiavathi Valley Hydro-Electric Project and from there to Sagar where KFD cases were seen. Visit to the Medical Officer of Health and lunch at Shimoga. Shimoga to Tarikere to Pammangandi where we spent the night.

The problem of labor on the Bhadra Reservoir Project is complicated by the system of sub-contracts for the individual bits of work to be done on this project. The sub-contractor hires and fires labor at will with no overall control for the 26,000 people working on the project. The present schedule calls for all houses to be visited at least once each month by the inspector looking for fever cases. Fever cases found are treated with the object of, and I quote: "The treatment is aimed at radically curing all malaria cases." "The number of cases has been reduced to a minimum during the latter months of 1958. This reduction has been mainly due to the prevention of relapses by the treatment of malaria cases with 8 aminoquinolines which eradicate the malaria infection in most of the cases by destroying the tissue parasite."

The following table gives the summary of past experience:

	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>
Population by year	26,320	26,320	51,857	36,232	25,097	21,859
Treated cases by year	726	1,277	1,260	2,410	6,009	1,810
Cases per/1000 per year	27	49	24	66	240	82

Jog Falls, Mysore State, India

After taking some more pictures of our Indian friends together with the doctors from the RF we started back over the same trail we came in on last evening but stopped at construction project for a dam which has some 26,000 employees and is expected to last 10 years before completion. Some cases of malaria are being found among workers from other regions but no cases have been found here during the past five years, 2-1/2 of which have been without routine spraying and under surveillance. It would seem that we have here a definite answer to those who say drugs are needed to finish the final residual cases of malaria in an area!!!

We stopped at Sagar (data on the malaria situation) and for a visit to the hospital where we see cases of KFD diseases.

Later in the morning and during the lunch hour (without lunch) we had an excellent opportunity to see and study at close range the conditions under which KFD occurs. There was a trip interruption due to a natural degeneration of old rubber in tires.

Friday, 6 March

Left Pemmnagundi to Shikmagalur and on to Belur where we visited the upstairs office of the Medical Officer of Health and had lunch. After visiting the temple in Belur we go to Mudigere, visited the office of the Medical Officer of Health, and on to Sakleshpur where the night was spent at the home of Mr. H. Radcliffe (Otherwise we might have stayed at the Manjanadab Club.), one of RBW's tiger hunting friends where beautiful large tiger skins were in a separate display on walls and floors throughout the villa. When the temple at Belur was visited some pictures were taken. This temple is in active use at the present time and is indeed a wonderful example of stone work both inside and out.

Saturday, 7 March

Visited the field station at Sakleshpur and went on to Puttur for lunch and to visit the malaria unit. Left Puttur for Mercana in Coorg where the night was spent. Regarding the malaria surveillance work in the Coorg District, spraying was interrupted on 7 January 1957

after instructions of the Expert Committee composed of DKV, BA Rao, and IM Puri. This Committee visited the Coorg District in June 1956. The little report containing this information should be attached to the diary notes as a very interesting document. (This completes the dictation from notes, now available on the trip to Asia, in 1959.)

Sunday, 8 March

Visited the Health Office at Mercara and went on to Gonikoppal. After lunch drove to Mysore and on to Krish Raj Sagar and spent the night.

Monday, 9 March

K. R. Sagar to Mysore and on to K. R. Magar and back to Mysore.

Tuesday, 10 March

Mysore to Coonoor, and spent the night.

Wednesday, 11 March

Coonoor to Mysore. Lunch at Mysore as the guest of the Indian doctor from South Africa. En route Mysore to Bangalore, visited Mandya where there is a malaria investigation with a Malaria Training Center. This was the original site of the Training Center set up by RBW some years ago. Also stopped at a health center where there is a family planning unit established before returning to the hotel in Bangalore.

Saturday, 14 March

To Delhi.

Sunday, 15 March

B. A. Rao.

16-21 March

Malaria

Sunday, 22 March

In Delhi; a rather hot Sunday at that. The day was spent in the writing room of the Ashoka Hotel, trying to summarize the impressions of the past few weeks for Dr. Bugher.

Monday, 23 March

Dinner at the home of Prof. and Mrs. Dikshit with Dr. and Mrs. Pandit, Dr. and Mrs. John Hume, Dr. and Mrs. Roy Allen, and Dr. and Mrs. Lucien Varig.

Tuesday, 24 March

The first holiday of the Holi celebration. All day at the hotel writing reports for the trip and finishing a letter to Dr. Bugher. The Holi festival in India is one that is not universal but it is very much celebrated in north India. It is characterized particularly by the throwing of dyed, scented water on one's friends and the better the friendship the deeper the dye and the more certainty of its delivery.

Wednesday, 25 March

Fly to Bombay with Mrs. Balfour and Don Johnson. At the Santa Cruz airport, Bombay, we are met by Dr. T. Ramachandra Rao who reports that H. Trapido is not sending his car which has had an accident but has asked him to bring us all up the hill. A very interesting but hot and tiring trip up the Ghat, arriving in Poona about the middle of the afternoon. Go to the home of Dr. T for the night.

Dinner is late, awaiting the arrival of Dr. C. Pandit. Those at dinner, besides the Sopers and the Trapidos, were Dr. Pandit, Dr. and Mrs. Anderson, and Dr. Ruth Meyer.

The evening discussions were related to various subjects, with special emphasis on the possibility of eradication of smallpox in India. Dr. Pandit said that he has been made responsible for presenting a plan for national eradication. The plan he is submitting provides, first, for pilot project in a number of states to get a basis for estimating costs of the organization required, then for early preparation of adequate stocks of vaccine and a budget sufficient to vaccinate everyone in India in one year. (I had previously discussed with Dr. Pandit the possibility of organizing smallpox eradication by carefully doing the vaccination of about one-fifth of the population for one year so the entire population would be covered within a period of 5 years. I am willing to admit freely that Pandit's method is better if the money can be gotten for putting on the type of organization that can do the job in a single year.) I would prefer to see provision made for a continuing recognition of the problem of smallpox for a period of 10 years with an adequate budget for covering a fifth of the population each year rather than attempt to get the funds with which to do vaccination of everyone in a year. Pandit's plan calls for 12 million dollars costs the first year.

During the course of this discussion with T. R. Rao today, I learned that D. K. Viswanathan was impressed with tales of eradication during the Tropical Diseases Congress in Washington in 1948, and on his return to India attempted the eradication of Anopheles culicifacies in a considerable area without success.

Poona is a city of some 500,000 people, about 2,000 feet above sea level, with only 29 or 30 inches of rain annually. The climate is hot at this time of the year and the air conditioned bedroom at the Trapido home was indeed a treat.

To the Medical Research Center where Harold Trapido showed the crowded conditions under which everyone is working, and then gave me the story of how the laboratory became busy with the KFD and Japanese encephalitis B and West Nile viruses. Trapido said that just two years ago, Dr. T. R. Rao went down through the Shimoga area with the malaria group, namely Martin Young, Jack Henderson, and Bruce-Chwatt who were here looking into the malaria situation in India for ICA. In Shimoga T. R. Rao was told by the local health authorities something about a disease of humans which was not malaria, and about a disease which was killing monkeys. T. R. Rao told Trapido about the information on March 23, Saturday, and on Monday Trapido and Dr. Worth were on their way down to Mysore State. They arrived at Sagar on Tuesday, saw their first sick monkeys on Wednesday, and by Monday night had word from the Laboratory in Poona that mice were coming down with some virus disease. The rest of the story is mostly in the published reports, but suffice it to say that in less than three weeks the KFD disease had been worked up much faster than is known to have occurred in the case of any other disease.

Called at T. R. Rao's headquarters and find him indeed in very crowded conditions. An attempt is being made to train men in microscopical work on a veranda and it is quite obvious that he has never been properly installed following a fire which did some damage a few years ago to the Malaria Headquarters. It is difficult to believe that a malaria eradication program responsible for a population of some 50,000,000 people can efficiently operate under the conditions at the Poona Headquarters. T. R. Rao has no adequate assistant and is unable to delegate authority for even the most minor financial transactions.

March 27

We travelled last evening by train from Poona to Bombay and spent the night at the airport hotel. This morning we took the early morning plane to Aurangabad from Bombay.

Met by Dr. G. N. Joshi who took us to his home to meet his wife and three boys. Mrs. Joshi and the elder son went with us this afternoon to the Ellora Cave. Dr. T. R. Rao arrived during the day from Poona by car, with Don Johnson, which resulted in continued discussion of malaria during the evening and during a considerable part of March 28. We all spend the night at the Indian Airway Hotel.

March 28

Sixty-four miles drive to the Ajanti Cave and back to Aurangabad where we take the five o'clock plane for Bombay. In Bombay we leave Don Johnson and take the evening plane back to Delhi.

During the day T. R. Rao insisted on repeating the entire story of what happened in Kanara where he believed the anthropophilic A. fluviatilis was exterminated, leaving only a zoophilic strain. Dr. Rao agrees that

eradication is possible and says that it will be gotten although he recognizes fully the difficulties of administering a service as large as his without a man to help at the top.

During the day T.R. gives some details of a serious outbreak of malaria in his State last year, which he attributed to the development of resistance to dieldrin on the part of the vector. TR estimates that 65 per cent of some 125,000 people were ill. (This forms quite a reservoir of infection which will again require some three years to disappear, under best conditions.)

March 29

To Jaipur and Amber by plane. Visit the ruins at the Rhambad Palace Hotel after lunch, where we join the Humes and the Troi Johnsons. (Much of the day spent with George Kindred of Scarsdale, New York, with whom we shared expenses.)

March 30

Learned that the trip to Nepal cannot be made through failure to get plane reservations. Dr. and Mrs. Leroy Allen had dinner with us at the Ashoka.

March 31

Learned at last that the secretary whose services were made available to me by the Rockefeller Foundation office here is of no value whatever. More time is taken in correcting his mistakes and in reading his own shorthand than it would have taken me to do the work myself.

April 5. To Kashmiri.

April 6. To Delhi.

April 7. To Benares.

April 8. To Calcutta.

April 9. To Bangkok.

Arrived at Hotel Erawan about 0215 after a very long day, beginning with a 0600 start from Clark Hotel in Benares to see the famed and famous River Ganges; its early morning bathers, its begging pilgrims, its professional vagrants, its cremation, its one dead animal carcass--probably a cow with a vulture and crow busily riding downstream, and the fantastic buildings along the River which has a difference of water level of many meters from one season of the year to another. The flight from Benares to Calcutta was by India Airlines Corporation; the trip from Calcutta to Bangkok was by Pan American Airways.

On arrival at Bangkok the inspector of the immigration at the airport asked for three photographs of FLS and another three of JSS. (He seemed surprised when I asked him when he wanted the photographs. On his reply that he wanted them now, I asked him where his photographer was and assured him that I am trying to comply with any and all requirements of his government by visiting the Embassy in Delhi, where I had been informed that with the passports JSS and I hold there would be no requirement whatever. The answer to this was that I was given 15 days to get out of the country.)

At the Erawan Hotel we find a partially air-conditioned room which is much better than the outside temperature, even at three o'clock in the morning. And so to bed and later finishing breakfast at 10 a.m.

Melvin E. Griffith sends a car for me; fortunately, the USOM is now in air-conditioned buildings and the hour spent with Griffith, Dr. Charles Richards, Dr. Harold Brown, and Dr. Joseph M. Butler, Jr., was pleasant in spite of the outside heat, which was quite noticeable during the lunch hour since the USOM lunch room is not air-conditioned.

Dr. Richards has been out only 13 months and is now recovering from an attack of infectious hepatitis. Richard is not married, is from the University of Nebraska, and is involved in the long continued efforts of the USOM to get a medical school started in Chiangmai in the northern part of the country.

R. is convinced that two years is only too short a period for overseas staff to be posted in a country.

Dr. Harold Brown of the Veterans Bureau is finishing a tour of two years and returns to the United States next week. HB says he has had a great experience here, the family has liked it, and everything is nice except for two things: (1) the period is too short to follow programs through to a conclusion, (2) he is sure that both he and his family will have some problem of adjustment to life in the United States.

With Dr. Griffith visit Dr. Utai, now the Director of the Malaria Service. Utai says the continuation of transmission in part of Thailand has been due to the failure to follow up in the rest of Thailand with the techniques and with the same relative number of men as was used by the WHO Demonstration Team in 1949. In the Demonstration Area, sixty men were used for a population of 60,000, but in the country program the work had been done with five men for 100,000 population. Unfortunately, the difficulties of the service are coming after most of the malaria has disappeared, and at the low tide of human interest.

I raised the question of the function of surveillance. Should it be the means of finding cases to treat as the final step of the eradication program, or should it be a tool for getting information as to where control measures have been poorly used?

Dr. Utai says Thailand today is a problem of the people in the forest.

Dr. Utai says the Rockefeller Foundation could be of great value if it would come in and help prove that diseases other than malaria are important as causes of febrile illness and death. Thailand needs help in the study of virus diseases, not only for their own sakes but to get them out of the malaria statistics.

Utai says governments are not working together on anything but the easy Mekong Valley parts of the program. Wherever it is difficult other countries are not following through.

Opposition comes in some areas to the anti-malaria work from the local quacks and others who derive their living from fever cases and who do not want to lose their income.

In discussing places with similar treatment but different results, MEG mentions a place called Phra Buddha Phat, where the same type of work was done as in Hang Dong and Sarapee but where results were not so satisfactory and so conclusive.

During the talks with MEG I learned that the picture of progress with the control of malaria here has been the picture of communicable disease control rather than the curve of eradication. The eradication curve is one of geometrical regression and does not flatten out interminably. MEG says that everything seemed to go very well during the first five years of operation; the sixth year's results showed no improvement over the fifth year's, and the seventh year's results were no better than the sixth year's results.

I point out that the speed of eradication is surprisingly fast when eradication is really occurring and suggest that Drs. Utai and Griffith should study the results of the best programs in Thailand and take these as the standard for the norm of eradication. Utai and MEG agree that the best results were in Chiangmai but especially in the district of Sarapee and Hang Dong. A study from the results from Sarapee and Hang Dong shows that the second year after the program started, that is, during the third year, very little malaria occurred. This means that after two years of spraying practically no malaria should be found and none at all after three years under ideal Thailand conditions! Whenever malaria fails to disappear the malaria cases should be thoroughly investigated and the reason for the failure ascertained and action taken to correct the cause of failure. I insist that the curve of eradication is always downwards. Geometrical regression can and should be just as steep downwards as the curve of geometrical progression.

April 10

Call on Under-Secretary Dr. T. Bin and the Director of Health, Dr. Kandthorn; also visited the office of Dr. Fitzmaurice before calling on Dr. Ayerkwait, retired Director of the Malaria Services, who makes arrangements for us to go to the country tomorrow.

Lunch at a Chinese restaurant as guest of Dr. Stengh, the head of the new School of Medicine, who gives the party to eight people

for Dr. Harold Brown. Those present include Dr. Griffiths, Dr. Richards, the Professor of Biology and the Professor of Chemistry in the new School (too much food for all but very good).

Meet Engs. Wood (tall boy from Texas) and Robertson who used to be at Massachusetts and is now finishing his first two years in Thailand and expects to come back for another tour.

Late afternoon "tea" with Miss Virginia Arnold of the Rockefeller Foundation and Mrs. Hassenpflug, the Director of the Nursing School of UCLA who is traveling at RF expense and who has her husband, a real estate operator in Los Angeles, with her. Mrs. H. tells a delightful story of their going to a Japanese Inn in Kyoto some weeks ago, when it was supposed to be closed, and of having first one hot water bottle for two beds and then the next night two hot water bottles for one bed.

In the evening with Dr. Kandthorn, the DG for Health, to the outdoor reception given by the Medical Association for the recent graduated doctors who received their diplomas. It is a shock to hear "Hail, Hail, the Gang's All Here" immediately after the National Anthem and just after the toast to the King and Queen. (We get a chance to meet a number of professors and others of interest, and a Miss Anderson from So. Africa who used to work for WHO in Africa on nutrition, is now here on loan from WHO to FAO. Miss Anderson says that in Thailand they remove the vitamins from the rice, and then enrich it under government subsidy; Thailand is one of the best fed countries in Asia, since it is a food exporting country.)

We do not partake of the dinner for the recent graduates but are taken by Dr. K. to the Golden Dragon where we have a very excellent Chinese dinner in company with Dr. Young, a nutritionist, and another colleague who was quite voluble during the early part of the evening but eventually passed out at the table.

April 11

Drs. Melvin E. Griffith and Ayurakit, who has been working on malaria for many years, came for us at 0725 for a drive to Phrabuddhaphat where one of the malaria training stations is located, the other being at Chiangmai in the north. The road is relatively good but the drive still takes almost three hours from Bangkok.

As one drives through the country outside Bangkok one is reminded of Guayaquil and the lowlands of Ecuador by the type of houses built up on piles, and of the Netherlands by the absolute flat nature of the land which is so like the polders from which the seawater has been pumped.

We are told that there is evidence of the rising of the land where Bangkok is now located during the past few thousands of years.

Arrived at the Malaria Training Center which is also the Center for Malaria Operations in this area; Dr. Ayurakit brings out his reports for

the surveillance work which is the only work now being carried out in this area.

The report form is a very simple one, providing for a complete census by family groups or by groups of persons living in the same house. Names of each individual are written out and the indication of sex is by name only. Actual ages of each individual are given, together with an indication of history of fever during the previous seven days or even for a longer period. When such history of fever is present a slide is taken, and drugs given, and duly registered in this form. The final diagnosis, when positive, is also entered.

Among the first 14 slides taken, on the record which by chance I see, 4 positives were found of which one was falciparum infection.

The positive had occurred in slides taken on the 2nd or 3rd of March, and had been examined almost immediately, that is, within one or two days, but no further information was available regarding this slide nor regarding the people from whom they had come.

On checking up on actual use of the forms, it is found that the census form is the only record available; the field operator prepares this form and submits it to the laboratory, together with slides of fever cases found. The laboratory makes its examination and enters on the census form the results of each positive slide and sometimes enters, and sometimes not, the negative results. There is no indication of the date of the examination of the slide nor who made it. Also, there is no record of the laboratory number of the slide itself.

When I expressed surprise that no follow-up field investigation has been made on the positives found, MEG explains that there is no provision for any further investigation because of a lack of men and money; that the present study which is designed to visit each house every season (that is three times a year) is really for survey purposes only, and that only in 1961 will there be any follow-up if present plans go through!! (In other words, all the work done this year and next is for the purpose of finding out where cases are occurring, without attempting to determine whether the cases have been found of local origin or have been imported!!) When I began to put on pressure regarding the use of the census forms, Dr. G. asks Dr. A. about the use of the new card form which has been adopted and is to serve for presentation of material for the big IBM analysis of the surveillance data.

April 11, Thailand

Notations of material for the big IBM analysis of the surveillance survey MEG is planning and which he told me about at his office:

Ayurakit indicates that they are beginning to use the card and are taking off the data from the census forms and entering on the cards as fast as possible.

MEG explains to A. that this is not what was intended but that the card has been designed as the only record to be kept. Dr. A. explains that this is not possible since the men in the field are not able to remember all of the data from individual houses in order to fill out the card which is essentially a summary form itself. (A. reports almost word for word a criticism I made of the card when I saw it in the office yesterday.)

I take time to discuss the matter of forms for the present operation and call attention to the necessity of deciding, before preparing forms, first, what is the unit of interest in the study, and, second, what are the items of interest regarding that unit.

Once a unit has been determined, all data regarding that unit should be placed on a single horizontal line with different units following each other, line by line. Each item of interest is given a certain position in the horizontal line in such a way that summation may be made rapidly by vertical addition.

With regard to the actual problem, I suggest that the unit of interest is the house, as the place where transmission occurs and is the unit of spraying. The house also is fixed geographically and can always be found. So, in the present study, although individuals are being studied, we are interested in the individual only as one of a family group living in a certain house. Therefore, a single line should be given to each house (which should be identified by some number) and by the name of the head of the household. The number of persons in the family group, as well as the ages of persons in this group, can be registered by setting up a classification called ages-by-groups (MEG suggests groups 0-1, 1 to 2, 2 to 4, 5 to 9, 10 to 14, and 15 and over. I propose a separate space for each age group and a space for the total number of people registered. This makes it possible to get data for summaries without the laborious procedure of working over reports in which all ages are listed together. The forms should have then the other items which are given in the present census form regarding fever and any treatment given.)

Once an individual is found to have had or to have fever, he becomes a unit of special interest and merits further listing which for convenience and for copying data together may well be made on the back of the census forms itself.

The forms for registering these persons who have had fever and who may be of special interest later should be done in such a way as to

reflect this possible future interest; that is, certain basic epidemiologic data should be collected at the time the slide is prepared regarding the time of residence in the place where fever has occurred and the indication of the place from which the individual has come.

There will be then on the form prepared in the field all of the information required for the summary cards now being proposed as well as some additional information of value when positives are found.

I insist once more with MEG that basic data must be registered at the time by the field worker and that all summaries must be from written records. The original record must not be itself a summary.

MEG has been here for seven years and is asking to be sent back after his next leave. (This leave is due in the fall but MEG has asked for a delay in order, I suspect, to be here while WHO is making its survey of conditions.)

On one of the reports I saw three or four positives had been found in the same family but no attempt was made to find out anything about whether this family came from outside the district where the infections were reported or not. MEG is placidly spending money and time to get a survey of how much malaria is occurring in the country with no provision being made for doing anything about the malaria found nor for finding out whether the malaria found is local or imported.

After the foregoing discussion, we go to the field for a couple of hours in the area where malaria has not been found to be transmitted for some years and from large parts of which Anopheles minimus has apparently disappeared. We get as far as the dam where there is very little water because of the failure of the rain during the past two years. (Near the dam I take some pictures of a long dragon and some of the hills in the distance.)

This area is in the beginning of the foothills and is an area in which before the control of malaria it was impossible for the people to live and work. (Last year this previously heavily malarious area is reported to have exported 35,000,000 bahts of agricultural products. In any case there are now 10,000 families living in the area.)

After lunch we visit the footprint of Buddha and a small and not too clean cave with a large, fat, smiling Buddha.

And so back to Bangkok where we attend a dinner given by the teaching staff with whom he has been working for Dr. and Mrs. Harold Brown of Utah, who are returning to Salt Lake City next week after two years here.

In glancing over the paper "Malaria Eradication in Thailand" one comes across some words of high significance in relation to the criticism I have placed in today's notes: "The ICA assisted projects aims towards developing and implementing the anti-malaria campaign and reducing malaria

to a point from which eradication is assured! (The exclamation point is mine! FLS) It is expected that the project can phase out in 1962 with malaria largely eliminated and a continuing program established on the regular Thai Government budget to complete eradication by 1965." (But eradication curve does not flatten; if ICA and Government together cannot get eradication in 11 years, how expect the Government alone to do so in three more years???)

Further notes on this paper:

1. Statement is made that surveillance is bi-monthly whereas MEG says that it is three times a year.
2. Surveillance may be instituted after one, two, or three sprayings but is always used after fourth spraying with additional spraying limited to proven foci of transmission.
3. Program includes large-scale program in malaria treatment with drugs distributed through hospitals, health centers, and field units to treat over five million cases (but fails to indicate whether these five million cases represent the entire program since 1951 or is current annual treatment).
4. Learn that Thailand is member of anti-malaria Coordination Board representing six countries including also Burma, Cambodia, Laos, Malaya, and Vietnam. (This Board may be useful but it has not been sufficient to get Malaya off the ground and even thinking of anything more than a pilot project of 50,000 people and that far from the Thailand border.)
5. In Thailand spraying is substituted by surveillance "when the annual technical surveys show reduction of the malaria problem below a critical level." (I presume this critical level may be in essence the same as the threshold concept in the eradication of yellow fever years ago when it was noted that yellow fever did not continue in a city after the A. aegypti index had been down to 5 per cent or below.)

One cannot but be disappointed in reading that the "malaria death rate in 1957 was thus only 18 per cent of the rate during the five years preceding 1950 when spraying began...the spraying campaign began in areas of less than 100,000 population and did not reach all malarious areas until 1957...the above results were achieved with 57 per cent of the campaign completed." The annual number of deaths from malaria beginning with 1950 has been 35,819, 34,225, 29,115, 21,451, 16,473, 14,520, 13,076, and 10,577 for 1957. This drop is by lysis rather than by crisis, and this reduction may be due in part to drug distribution rather than actual control of malaria. The percentage declines year by year have been from 1950 to 1951, 4.5; to 1952, 14.9; to 1953, 26.3; to 1954, 23.2; to 1955, 11.9; to 1956, 10.0; to 1957, 10.9.

The following costs are reported: 1951 to 1958 7,351,000 dollars; 1959 to 1962 3,464,000 dollars; 1963 to 1965 750,000 dollars; total 11,565,000 dollars. Of this amount the Government will have contributed

2,938,000 dollars; counterpart funds, 3,733,000 dollars; and the USA/ICA 4,894,000 dollars; all of the costs after 1962 are for the account of the Thai Government!

The following statement is so extraordinary that it merits full presentation in these notes: "The above plan will accomplish through three steps to the end point of eradication: 1. a house spraying campaign reaching the homes of over 12,000,000 people in the major malarious areas, averaging three to four annual spraying of each home to destroy malaria-carrying mosquitoes and stop malaria transmission; 2. a surveillance program reaching the homes of the same people in the same areas at bi-monthly intervals, for three years, following the house-spraying campaign, to search out and treat the remaining malaria cases; 3. a reconnaissance program in minor malarious areas (all areas in Thailand other than major malarious areas) reaching houses of an additional 12,000,000 people at bi-monthly intervals for one year to search out and eliminate any hidden foci of malaria transmission."

In looking over the report on birth and death in Hang Dong and Sarapee districts of Chiangmai received from Dr. Utai it is seen that in so far as deaths are concerned, the behavior was according to plan; work started in Hang Dong in 1950 with 232 deaths from malaria, three years later, in 1953, none were reported. In Sarapee district the death dropped from 213 in 1950 to 7 in 1953 and 3 in 1954 after which there were none.

A conclusion from the past two-month trip might well be that we had not underestimated the difficulties of eradication, but that we had underestimated the difficulty of selling the true concept of eradication and of getting administrative orientation to carry it out.

April 12

Late afternoon tea at hotel downtown on River Bank.

April 13

Call at the USOM and have final talk with MEG on malaria. Griffith reports that he has difficulties which cannot be put in the reports; that the present Director General of Health cannot understand why malaria should not be part of the general health service in each community; that the Civil Service of the country requires that everyone working at a supervisory level in the malaria service should have at least two years of special preparation (that means that the "Guarda-Chefe" in charge of four inspectors has to have two years training as a malariologist before appointment. I point out that this tends to negate the very basis of eradication which is that relatively undertrained personnel can carry out the technical procedures required for eradication after very short periods of training; there is no need for the man who is supervising spraying to know how to examine blood slides, and so forth.); that in the Malaria Coordinated Board which represents six countries, representatives of some countries come with instructions to give a picture of the

situation in their countries different from what actually exists; that all introduction of new forms and new ideas encounter resistance, etc. etc.

MEG says he feels that there is a definite need for some outside agency to make an overall survey of what is happening to malaria eradication with a presentation of the report in such a way as to make it apparent that the countries are in all this together and that a war against the malaria parasite cannot be won unless it is carried out as a war should be with some central control. MEG has suggested to ICA the appointment of a Regional Malaria Adviser for South East Asia since this area represents a number of countries which have common problems which require simultaneous solution.

MEG reports that Dr. Ayerkwait told him some years ago that previously--that is before 1951--there were many more monkeys at a monkey temple than at that time, and that the reduction in the number of animals had been due to a disease which had killed large numbers of the primates. I called attention to the importance of monkey deaths as an index of what may be happening in the human population, and suggest communication with laboratories should he ever get further stories of monkey mortality, which may come through the malaria surveillance service.

Learned that Miss Jones, who lives near Ellicott City, Maryland, is the Assistant to Sam Keeny in the UNICEF Regional Office in Bangkok.